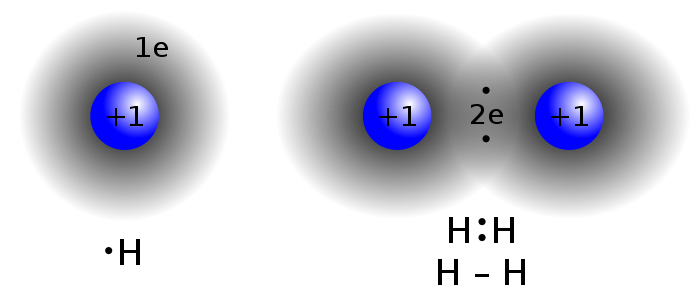
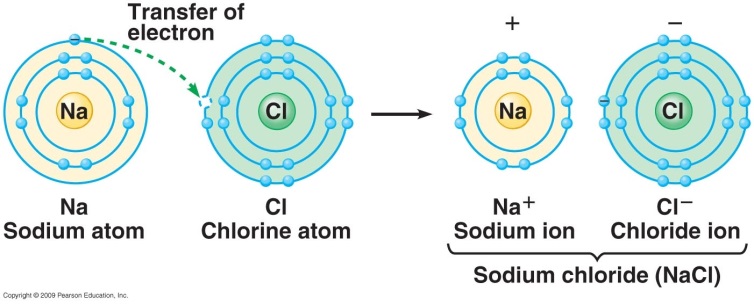
**Lab: Properties of Ionic vs. Covalent Bonds**

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**Purpose**: To compare/contrast the physical properties of six compounds containing ionic and covalent bonds. The physical properties observed will be: melting point, solubility, and electrical conductivity (as an aqueous solution).

**Prelab**: On pg 2, determine the types of elements in the bonds, and record in the data table as M for metals *only,* N for nonmetals *only,*  or M+N for *metals and nonmetals.*

THEN determine which type of bonding is present, ionic or covalent, based on the elements in the bond

**Procedure**:1. Obtain aluminum foil “boat” from instructor. Bend one corner slightly to indicate sample location. In each depression (“valley”), place only a few crystals of each compound. Do not allow the different substances to touch.

2. Draw or sketch the location of each compound in the diagram into the right. Record a brief description of each substance in the table.

3. Place the foil ‘boat’ on a hot plate. Record the order of melting (1st, 2nd, …) on your data table. After 5-8 minutes (instructor choice) record an ‘N’ if the substance did not melt. Turn off the burner and allow the set up to cool before you dispose of the aluminum foil.4. Pick up a conductivity tester (has small LED light(s) on it). Test that the unit is functional and battery is charged by placing a paper clip (unbend first to make long enough) across the tester’s leads.

Rinse your beaker with a small amount of distilled water a few times and then fill the 30 ml beaker to the half way point. Check with the tester that the beaker/water combination is clean. The tester’s lights should be off or very dim.

5. Add a small amount of compound 1 (about a pencil’s eraser’s worth) to the beaker using the labeled splint. Add water and stir. Observe for several minutes. Record observations in your data table as: *soluble*, *slightly soluble*, or *insoluble*.6. Test the conductivity of this solution with a conductivity tester. Record whether the solution conducts electricity, *yes* or *no*) in your data table. Rinse the conductivity tester between tests and retest in distilled water to prove the tester has been adequately rinsed.

7. Repeat steps 5 and 6 for the remaining compounds

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Pure Substance** | **Element in Bond** | **Bond Type** | **Order of Melting** | **Solubility** | **Conductivity** |
| 1. Glucose   C6H12O6 |  |  |  |  |  |
| 1. Salicylic Acid   C7H5O3 |  |  |  |  |  |
| 1. Calcium Chloride   CaCl2 |  |  |  |  |  |
| 1. Starch   (C6H10O5)n |  |  |  |  |  |
| 1. Sodium Chloride   NaCl |  |  |  |  |  |
| 1. Potassium Chloride   KCl |  |  |  |  |  |

**Conclusions:**

1. Look at the types of elements in the bonds. What types of elements in a compound tend to have a high melting temperature (did not melt)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. What is generally true about the solubility in water for the compounds with high melting temperature?

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3. What is generally true about the conductivity for the compounds with a high melting temperature?

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1. Complete the table below

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Bond Type | Type of Elements in bond | How are bonds formed? | Melting point (high or low) | Solubility (high or varies) | Conducts when dissolved (yes or no) |
| Ionic |  |  |  |  |  |
| Covalent |  |  |  |  |  |